LAr Test Stand

Brookhaven National Lab
11/24/2014

Outline

- Our Requirements
- Upgrade for existing test stand
- Discussion with Brian Rebel
- Outstanding questions

Upgrade - existing test stand

- **LAr purification system design** - Before moving to big dewar we want to design and test LAr purification for current test stand and see how LAr purification + existing GAr purification works together & helps in reducing time for purification cycle.

- **VME Readout system** - Required both for longitudinal (as a check) and transverse diffusion measurement.

- **Transverse Diffusion measurement** - MicroBooNE ASIC + electronic feedthrough + anode design

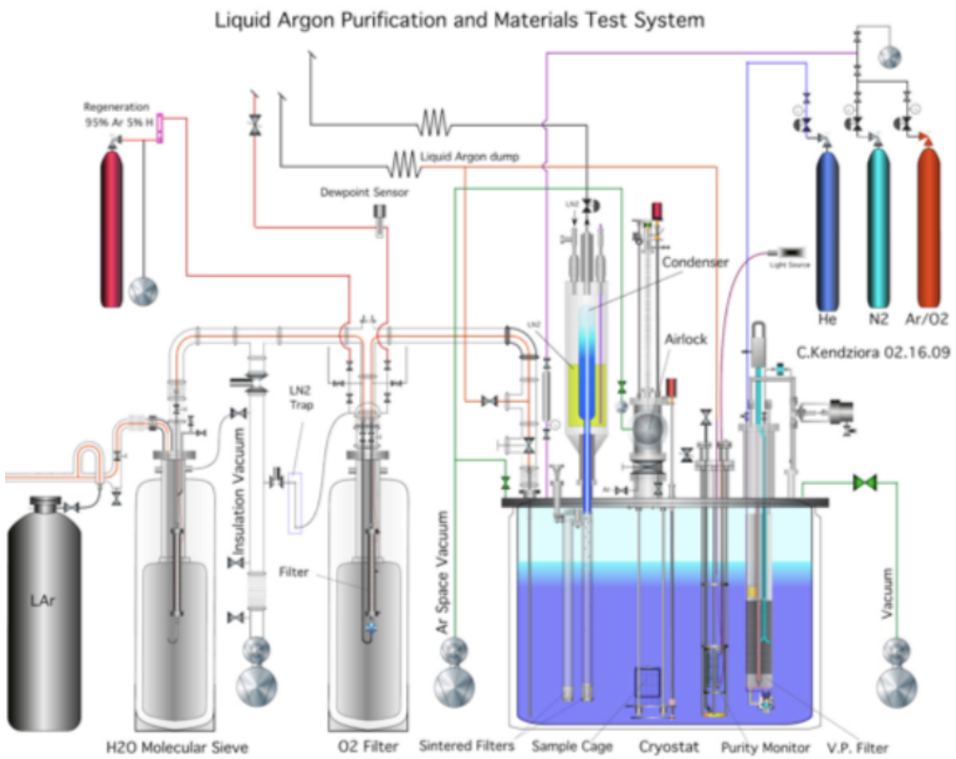
Discussion with Brian Rebel - Fermilab

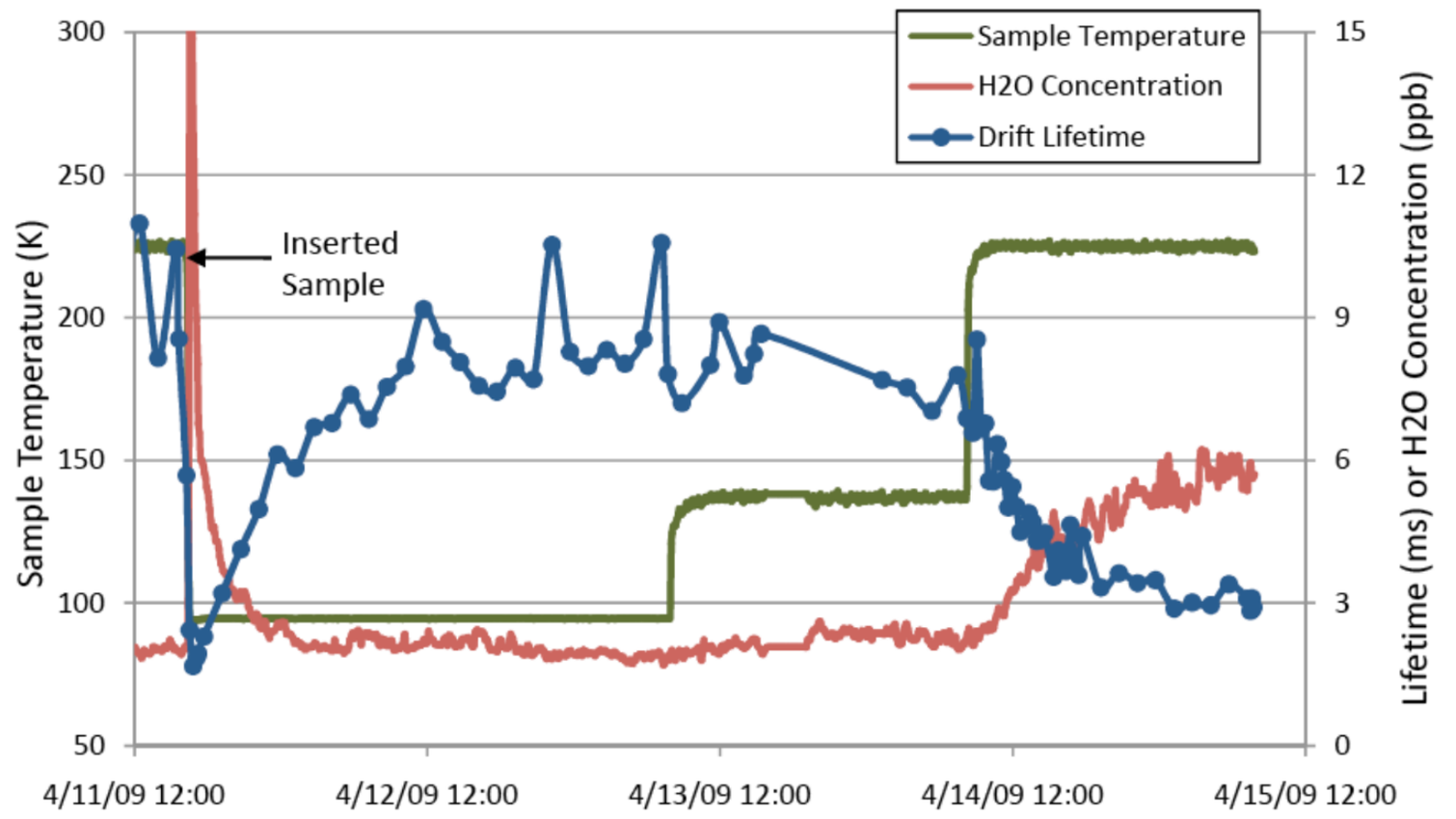
LAPD : contamination removed from system at different stages of operation

	Oxygen (g)	Water (g)
Gas recirculation	0.38	0.98
Cryostat filling	5.68	–
Integrated ullage outgassing during pumped liquid filtration	1.41	1.39
Pumped liquid filtration	24.09	–
Total	31.56	2.37
gram species per kilogram filter material	0.49	0.04

* **LAr purification :**
    * **4A molecular sieve to remove water**
    * **CU-0226 S (Alumina (80-90%), CuO (10-14%), MnO (< 1%), NiO (< 1%))**
* **Very hard to estimate the amount of water removed**
* **The CuO used in LAPD removed 0.49g of oxygen for every kg of filter material**
* **Molecular sieve can remove small amount of N_2 but not controlled well**

H_2O Contamination - MTS (Fermilab)





* **Direct relation between electron lifetime and water concentration**
* **Water contamination mainly comes from materials in vapor space, outgases forever and is a constant source of contamination. But it can be controlled by combination filters and maintaining surface area at a temperature below ~120K**
* **B. Rebel : Second LAr purification inside cryostat is required to maintain purification but gas purification may also work**
* **Never return condensed liquid back into the bulk.**

Outstanding Questions

- Engineering Support ?
- What exactly we need for justifying engineering support
- Any possible test with big dewar in next few months ?